

RESPIRATION

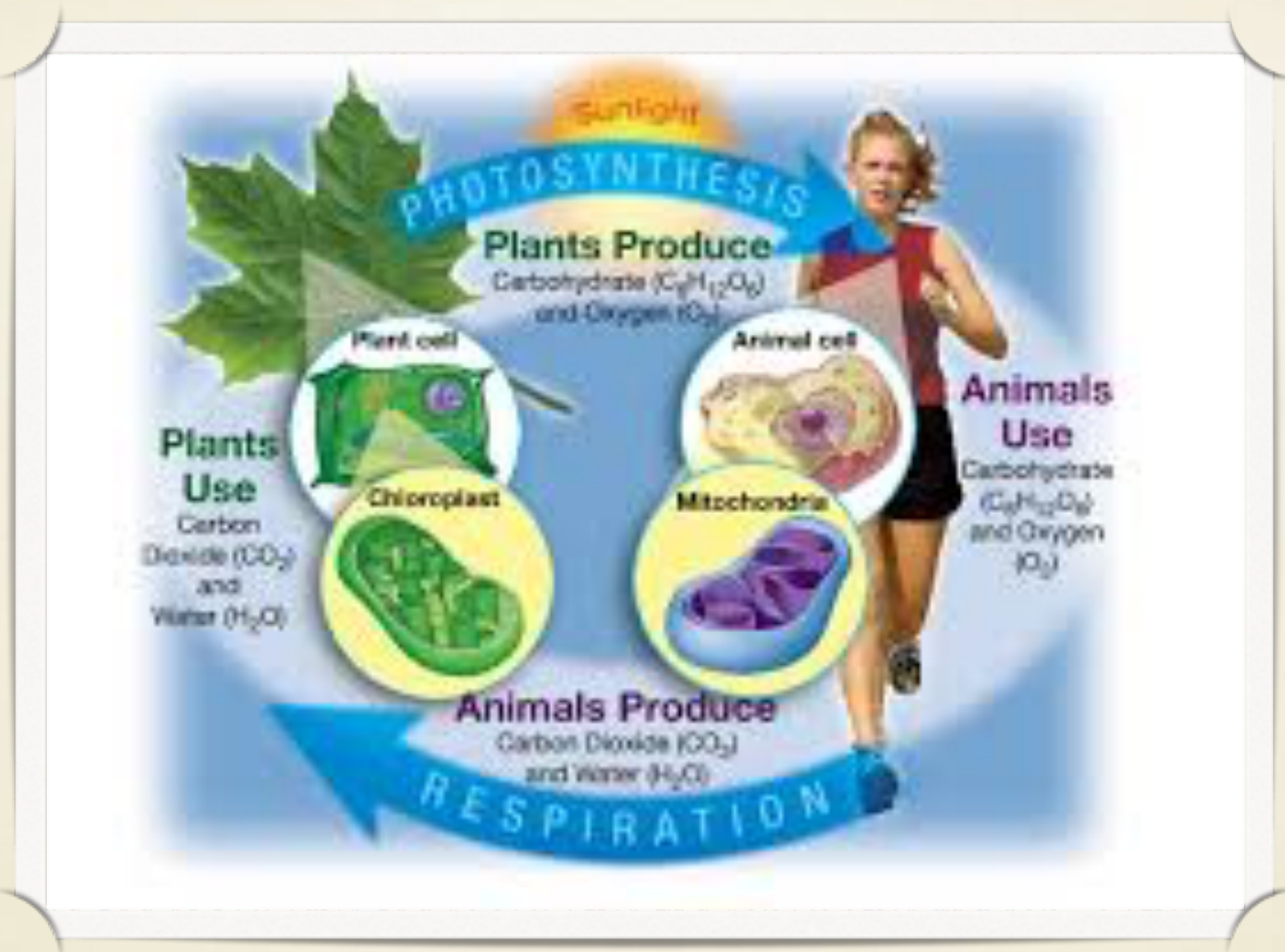
CELLULAR RESPIRATION

RESPIRATION

Cells store and use energy in a way that is similar to the way you deposit and withdraw money from a savings account.

When you eat a meal, you add to your body's energy savings account. When your cells need energy, they make a withdrawal by breaking down the carbohydrates in food to release energy.



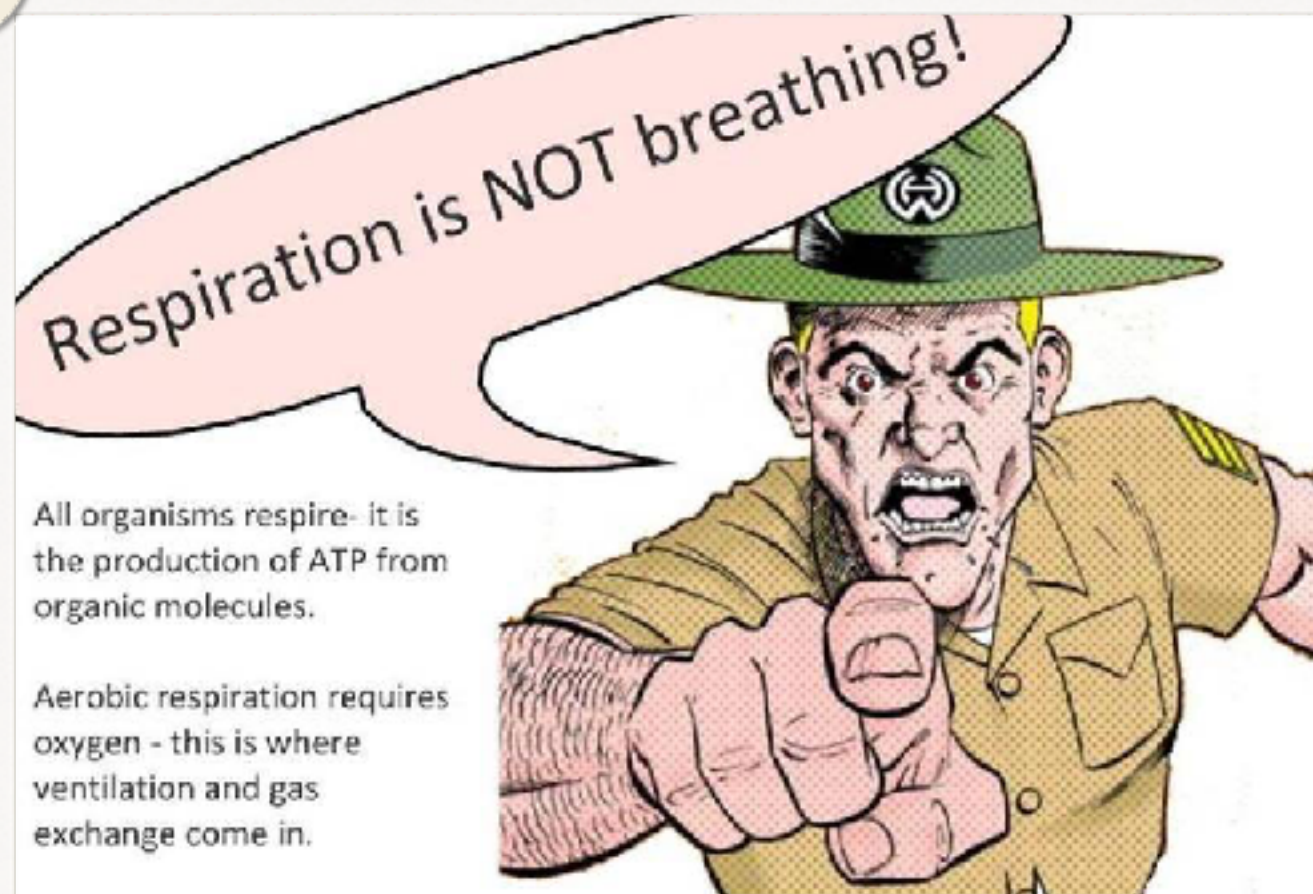


The process by which cells obtain energy from glucose (a type of sugar) is called **respiration**. During respiration, cells break down simple food molecules such as sugar and release the energy they contain.

Because living things need a continuous supply of energy, the cells of all living things carry out respiration continuously. The term respiration also is used to mean breathing, that is, moving air into and out of your lungs.

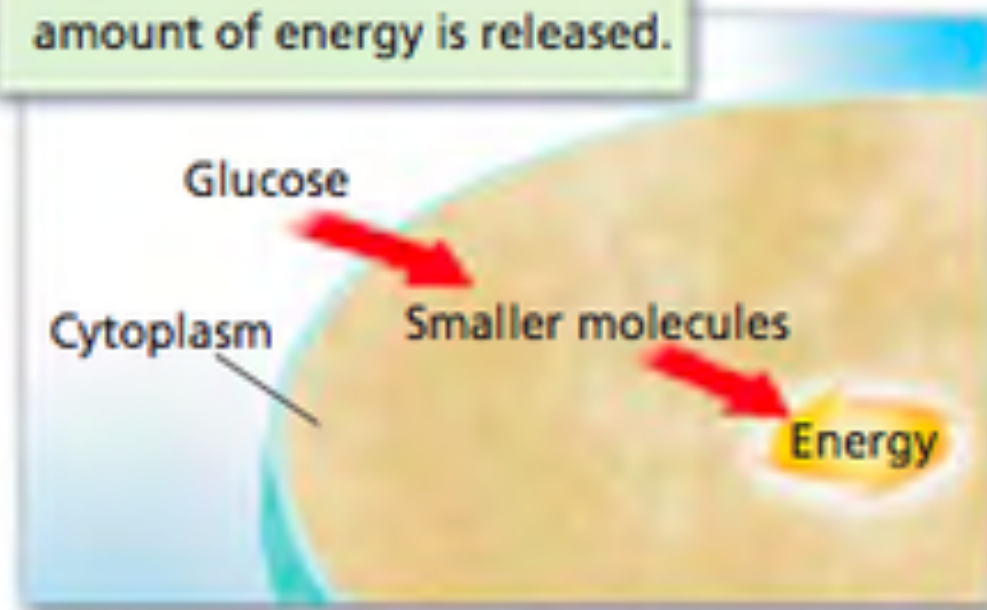
To avoid confusion, the respiration process that takes place inside your cells sometimes is called **cellular respiration**. The two kinds of respiration are related.

Breathing brings oxygen into your lungs, and oxygen is necessary for cellular respiration to occur in most cells.



TWO STAGES OF RESPIRATION

Stage 1 In the cytoplasm, glucose is broken down into smaller molecules. A small amount of energy is released.

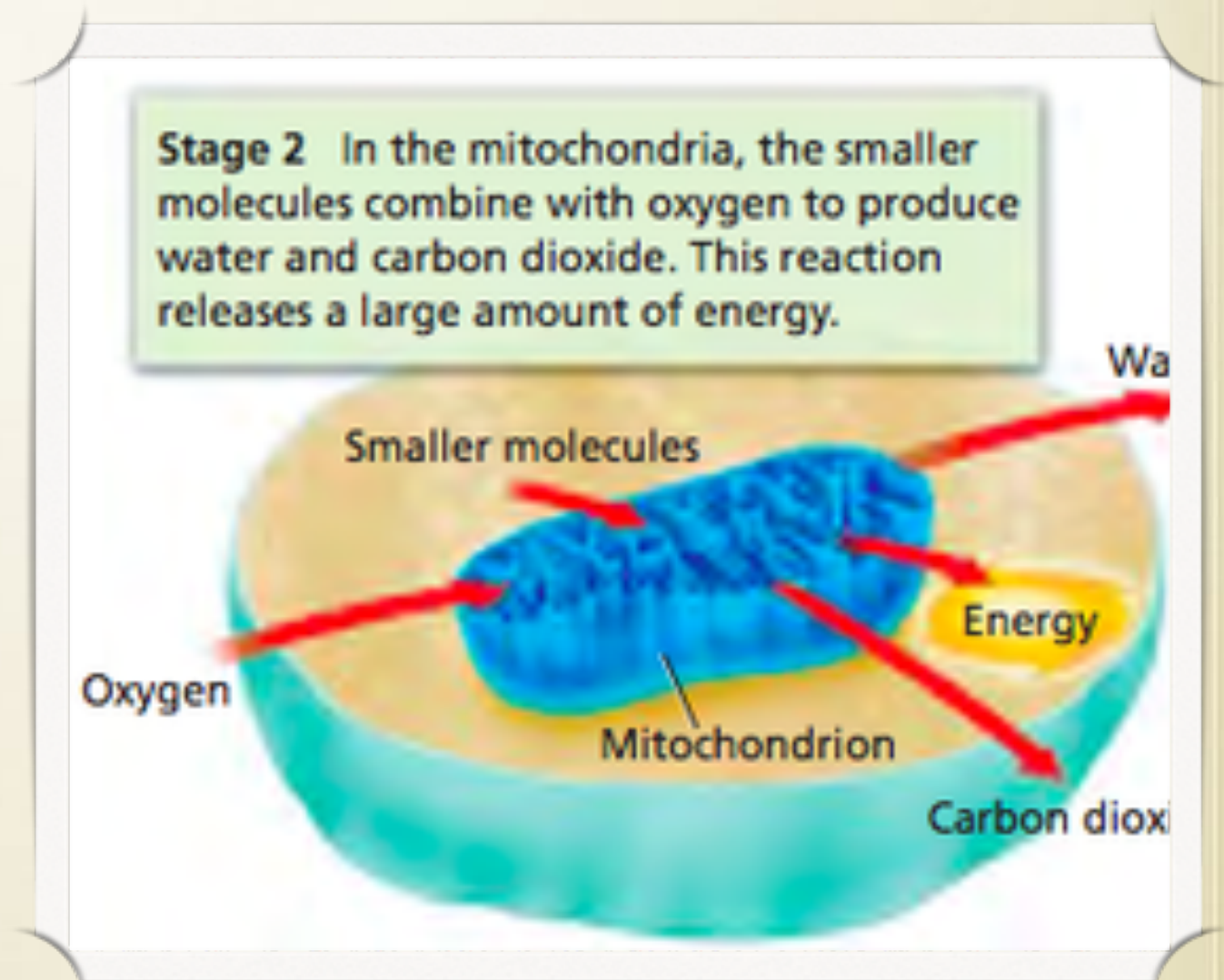


Like photosynthesis, respiration is a two-stage process. The first stage takes place in the cytoplasm of the organism's cells. There, glucose molecules, ($\text{C}_6\text{H}_{12}\text{O}_6$), are broken down into smaller molecules.

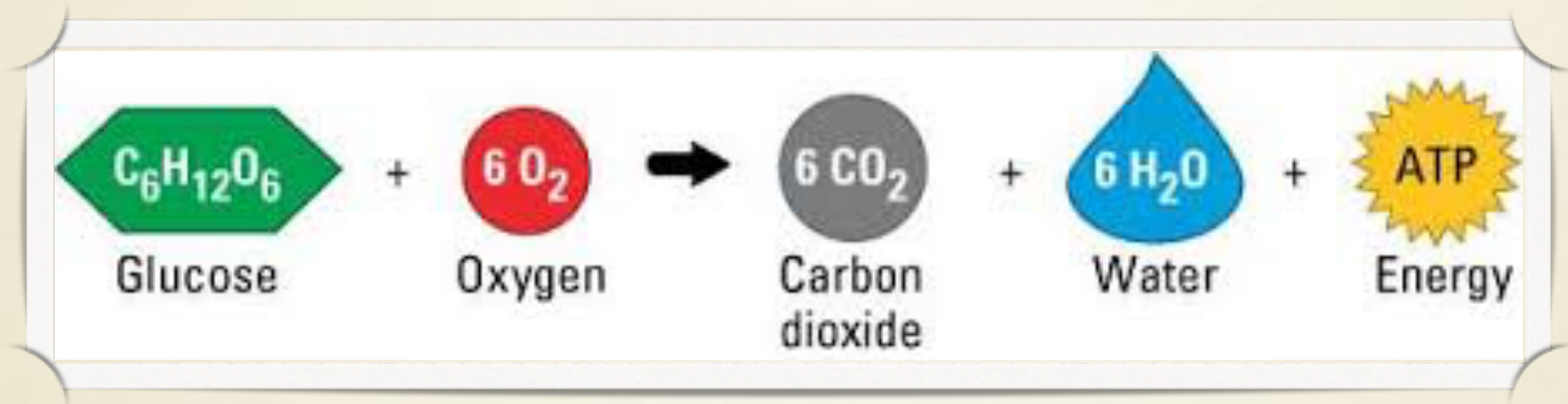
Oxygen is not involved in this stage of respiration, and only a small amount of energy is released.

The second stage of respiration takes place in the mitochondria. There, the small molecules are broken down into even smaller molecules.

These chemical reactions require oxygen, and a great deal of energy is released. Two other products of respiration are carbon dioxide and water.



RESPIRATION EQUATION



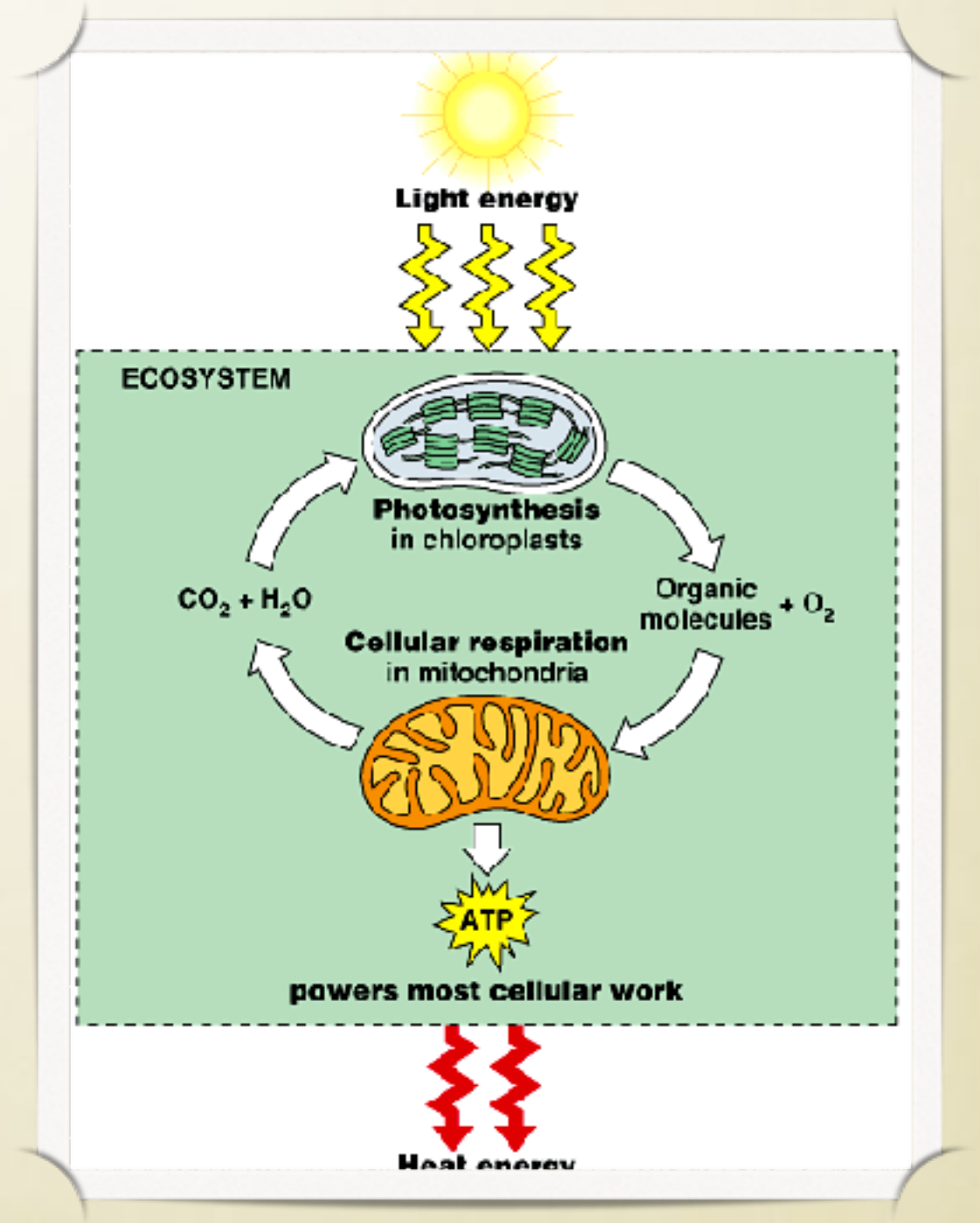
Although respiration occurs in a series of complex steps, the overall process can be summarized in the following equation:

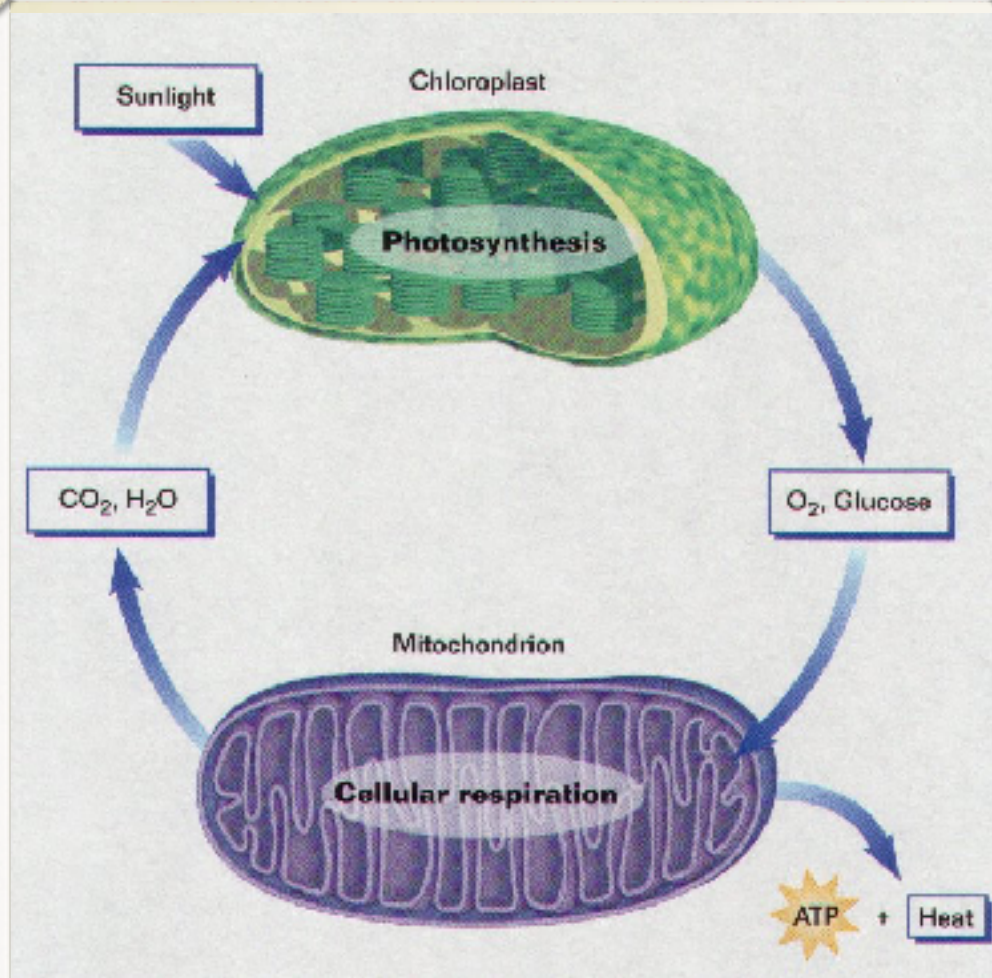


PHOTOSYNTHESIS & RESPIRATION

Notice that the raw materials for respiration are sugar and oxygen. Plants and other organisms that undergo photosynthesis make their own sugar.

The glucose in the cells of animals and other organisms comes from the food they consume. The oxygen used in respirations comes from the air or water surrounding the organism.





Photosynthesis and respiration can be thought of as opposite processes. Together, these two processes form a cycle that keeps the levels of oxygen and carbon dioxide fairly constant in the atmosphere.

Photosynthesis: Plants use carbon dioxide and release oxygen.



Respiration: Organisms use oxygen and release carbon dioxide.



FERMENTATION

Some cells obtain their energy through **fermentation**, an energy releasing process that does not require oxygen.

Fermentation provides energy for cells without using energy. The amount of energy released during fermentation is much lower than during respiration.

ANAEROBIC RESPIRATION AKA FERMENTATION

WHEN IT OCCURS IN
PLANTS

ALCOHOL

is produced from the pyruvate

This is what brewers
use for beers! Have you
heard of Beer
fermentation?

WHEN IT OCCURS IN
ANIMALS

LACTIC ACID

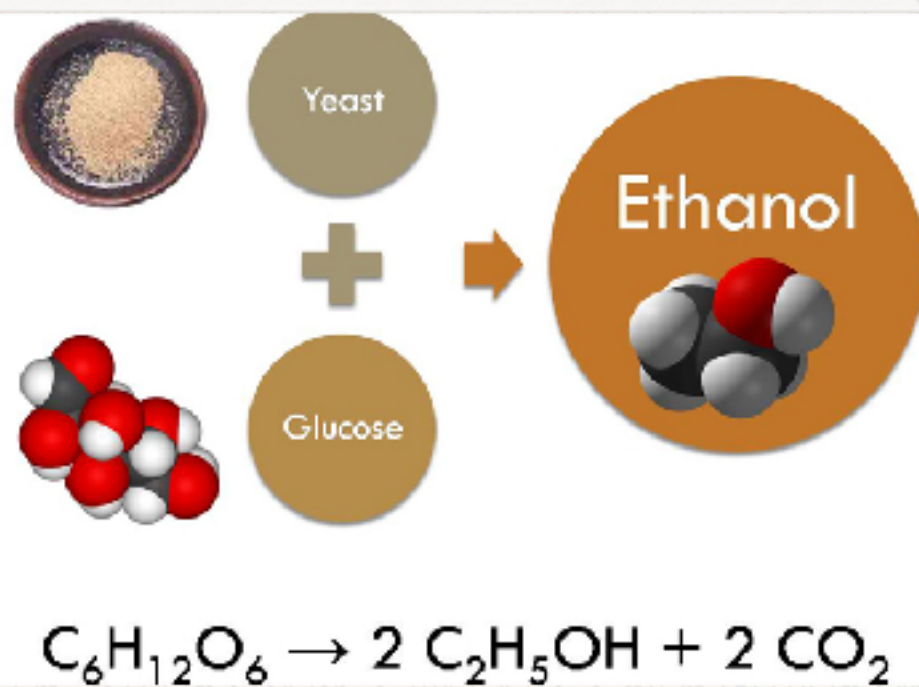
is produced from the pyruvate

Many athletes know about
this substance and its
side effects-
cramps/soreness

ALCOHOLIC FERMENTATION



One type of fermentation occurs in yeast and some other single-celled organisms. This process is sometimes called **alcoholic fermentation** because alcohol is one of the products made when these organisms break down sugars.



The products of alcoholic fermentation are important to bakers and brewers. The carbon dioxide produced by yeast creates air pockets in bread dough, causing it to rise. Carbon dioxide is also the source of bubbles in alcoholic drinks.

LACTIC ACID FERMENTATION

Another type of fermentation takes place at times in your body when your muscles run out of oxygen – for example, when you've run as fast as you could for as long as you could.

One product of this type of fermentation is an acid known as lactic acid. When lactic acid builds up, your muscles feel weak and sore.



KEYWORDS: **ENGLISH** - **SPANISH**

Cellular Respiration - Respiración celular

Fermentation - Fermentación

Alcoholic Fermentation -
Fermentación alcohólica

Lactic Acid Fermentation -
Fermentación del ácido láctico